

# Applied Research in Quality of Life

## Life Satisfaction of gifted and average adolescents in Hong Kong: Validation of the Chinese Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS) --Manuscript Draft--

<b>Manuscript Number:</b>	ARIQ-D-20-00465R2	
<b>Full Title:</b>	Life Satisfaction of gifted and average adolescents in Hong Kong: Validation of the Chinese Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS)	
<b>Article Type:</b>	Original Research	
<b>Keywords:</b>	BMSLSS, Chinese, life satisfaction, gifted students, adolescents, validity	
<b>Corresponding Author:</b>	Lue Fang, Ph.D Asia Research Institute Singapore, SINGAPORE	
<b>Corresponding Author Secondary Information:</b>		
<b>Corresponding Author's Institution:</b>	Asia Research Institute	
<b>Corresponding Author's Secondary Institution:</b>		
<b>First Author:</b>	Lue Fang, Ph.D	
<b>First Author Secondary Information:</b>		
<b>Order of Authors:</b>	Lue Fang, Ph.D	
	Mantak Yuen, Ph.D.	
	Eric Fung, Ph.D.	
	Jiahong Zhang, Ph.D.	
	Serene Chan, Ed.D.	
	Florence Wu, Ph.D.	
<b>Order of Authors Secondary Information:</b>		
<b>Funding Information:</b>	Hong Kong Research Grant Council (HKU 756312)	Dr. Mantak Yuen
<b>Abstract:</b>	<p>Despite the popularity of the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS) for use in research, this instrument has not yet been validated with adolescents of different intellectual ability levels and across different cultures. This study examined the psychometric properties and measurement equivalence of BMSLSS with a sample of 676 Chinese adolescents who are deemed 'gifted' and attending the Hong Kong Academy of Gifted Education, and 702 students with average achievement in mainstream high schools. Results indicated high internal consistency for the scale and a one-factor solution for BMSLSS with this population. Tests of configural, full metric and partial scalar invariance suggest that gifted students attending an academy conceptualize life satisfaction in a same way as their average attainment peers in regular schools. The findings support the applicability and measurement equivalence of BMSLSS for use with Chinese gifted and average-ability students.</p>	
<b>Response to Reviewers:</b>	<p>Reviewer #1: The research fills the gaps in related research and lays a certain foundation for future research. The author has revised the comments put forward and basically answered all the questions, but there are still some places that need to be minor revised. The suggestions are as follows:</p> <p>1. In the method part, why only select Grade 7 and Grade 9 students for Average students?</p>	
	<p>Response: we distributed the survey students in Grade 7 to Grade 9, we have corrected this info in our manuscript. We thank reviewer for pointing it out to us.</p>	

2. The author mentioned that he has obtained permission from the ethics committee, and the method part needs to be accompanied by the ethics approval number.

Response: Ethics approval number added: EA540112. We have added it to the manuscript.

3. How many questionnaires were distributed and how many were collected? Or the effective recovery rate of this study is 100%?

Response: The effective recovery rate is more than 95%, the decline respondents were due to time conflict or lack of interest for participating in the study.

4. It should be noted that the format and content of the table need to be adjusted. In Table 1, whether to use gifted students or students in gifted education, it needs to be unified. Table 2 is not the correct three-line table format. The format of statistical indicator numbers also needs to be unified, whether it is 0.48 or .48. The number formats in the two tables are inconsistent.

Response: fixed the format and contents of table 1 and 2.

Life satisfaction of gifted and average adolescents in Hong Kong: Validation of the Chinese *Brief Multidimensional Students' Life Satisfaction Scale* (BMSLSS)

Lue FANG

Asia Research Institute  
National University of Singapore, Singapore

Mantak YUEN

Centre for Advancement in Inclusive and Special Education  
Laboratory and Program for Creativity and Talent Development  
The University of Hong Kong, Hong Kong China

Eric FUNG

Hong Kong Academy for Gifted Education, Hong Kong China

Jiahong ZHANG

Centre for Research on College-Work Force Transitions  
Wisconsin Center for Educational Research, School of Education  
University of Wisconsin-Madison, U.S.A.

Serene CHAN

Centre for Advancement in Inclusive and Special Education  
Laboratory and Program for Creativity and Talent Development  
The University of Hong Kong, Hong Kong China

Florence WU

Centre for Advancement in Inclusive and Special Education  
Laboratory and Program for Creativity and Talent Development  
The University of Hong Kong, Hong Kong China

Please address correspondence to:

Dr. Lue Fang

National University of Singapore

Email: luf972@mail.harvard.edu

Dr. Mantak Yuen

Centre for Advancement in Inclusive and Special Education, Faculty of Education,  
University of Hong Kong, Pokfulam, Hong Kong SAR China

Email: mtyuen@hku.hk

Acknowledgements

The gifted students' data reported in this article is from the collaborative research "The Life Skills and Career Development Project" of the Hong Kong Academy for

Gifted Education and The University of Hong Kong Centre for Advancement in Inclusive and Special Education. The average students' data reported is from a project partly funded by the Hong Kong Research Grant Council (HKU 756312). We are grateful for the generous support of the participating students, their parents and school teachers.



Click here to access/download  
**Mark Manuscript**  
manuscript Feb 2021 .doc



**Life satisfaction of gifted and average adolescents in Hong Kong: Validation of the Chinese *Brief***

***Multidimensional Students' Life Satisfaction Scale (BMSLSS)***

**Abstract**

Despite the popularity of the *Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS)* for use in research, this instrument has not yet been validated with adolescents of different intellectual ability levels and across different cultures. This study examined the psychometric properties and measurement equivalence of BMSLSS with a sample of 676 Chinese adolescents who are deemed 'gifted' and attending the Hong Kong Academy of Gifted Education, and 702 students with average achievement in mainstream high schools. Results indicated high internal consistency for the scale and a one-factor solution for BMSLSS with this population. Tests of configural, full metric and partial scalar invariance suggest that gifted students attending an academy conceptualize life satisfaction in a same way as their average attainment peers in regular schools. The findings support the applicability and measurement equivalence of BMSLSS for use with Chinese gifted and average-ability students.

**Keywords:** BMSLSS, Chinese, life satisfaction, gifted students, adolescents, validity

## 1. Introduction

Over the past decade, researchers have developed keen interests in topics of ‘subjective wellbeing’ and ‘life satisfaction’ of young people (Lippman, Moore, & McIntosh, 2011; Proctor, Linley, & Matlby, 2009). Life satisfaction is a socio-cognitive construct that refers to one’s overall perception of quality of life. The Organization for Economic Cooperation and Development (OECD) (an intergovernmental economic organization) describes life satisfaction as how people evaluate their life as a whole, rather than their current feelings (OECD, 2020). The level of life satisfaction is not equal across OECD countries, with some showing much higher average satisfaction than others.

A wide range of factors can influence life satisfaction for adults and youth, including demographics (age, gender, socioeconomic background), familial (family structure, parenting, life events), self-appraisal (self-concept, self-reliance, efficacy), and socio-environmental factors (school, neighborhood) (Gilman & Huebner, 2003; Proctor, Linley, & Matlby, 2009). Life satisfaction in children and adolescents, as a facet of their developmental trajectory, appears to shape (and is shaped by) short-term and longer-term influences such as their coping competence, resilience, academic outcomes and psychological adjustment (Jiang, Fang, Lyons, 2019; Jiang, Lyons, & Huebner, 2016; Sun & Shek, 2009).

Early research had explored the possible role of intellectual giftedness in strengthening an individual’s life satisfaction (Diener, 1994). For example, at that time it was claimed that gifted students are more resourceful and high achieving, therefore happier and more satisfied with their lives (Diener & Fujita, 1995). More recently, these findings were echoed by Lubinski and colleagues (2006) who reported high levels of life satisfaction among a large group of gifted youths in the U.S. More recent studies have also found that gifted children often possess good socio-emotional adjustment, and that this in turn functions as a protective factor against difficulties in life that can undermine satisfaction (Francis, Hawes, & Abbott, 2016). On the other hand, some personality

traits evident in a few gifted students, such as perfectionism, may predispose them to obsessive and compulsive behaviors, leading to physiological stress and harm to their wellbeing and quality of life (Chan, 2007, 2012; Roberts & Lovett, 1994). Studies with gifted Chinese students have identified social pressure, particularly parents' high expectations, as a force in shaping their subjective wellbeing (Chen, Fan, Cheung, & Wu, 2018). This may arise because Chinese society has a long history of regarding and respecting giftedness more positively than perhaps occurs in the West (Huang et al., 2018; Vialle, 2007). Chinese students' academic excellence is highly valued by their parents, and the students are often given more attention and resources in school and family. There is an expectation that this will enhance their potential for securing well-paying jobs in the future (Li, 2017). However, studies have also confirmed that gifted students are often under immense academic pressure as a result of these very high expectations placed on them, and this can seriously erode life satisfaction (Chen et al., 2018; Huang et al., 2018). Evidence from these studies and from media reports indicate the necessity to understand better the levels of life satisfaction in Chinese gifted students, and how they may differ from students in the West and from their own peers who are less intelligent.

The extant research that has compared levels of life satisfaction in gifted students and regular students has yielded mixed findings. An early study by Huebner and Alderman (1993) had suggested that gifted students have higher sensitivity than regular students in distinguishing among the various domains of life satisfaction. However, some recent studies have reported negligible difference in life satisfaction between gifted and regular students (Bergold et al., 2015; Chmiel et al., 2012). In a Korean study, Jin and Moon (2006) found that there was no significant difference in overall psychological wellbeing between gifted and regular students, but gifted students reported higher levels of *school* satisfaction than their counterparts.

The research on life satisfaction has almost all been conducted in Western settings with participants from



individualistic societies. It not clear whether the findings also pertain equally to Asian populations where collectivist cultural influences on quality of life and wellbeing may be different (Proctor et al., 2009).

In order to explore the issues of whether life satisfaction is interpreted differently in different cultures, and whether high intellectual ability is a variable that may promote life satisfaction in a Chinese context, access is needed to a suitable assessment instrument. Many of the available measures of life satisfaction have not been validated specifically among gifted students from any background, but one that could be appropriate is the *Brief Multidimensional Students' Life Satisfaction Scale* (BMSLSS). This instrument is widely used and quick to administer for children and adolescents aged 8-18 years (Seligson et al., 2003). The items within the scale capture overall and domain-specific satisfaction in areas of self, school, friends, family and environment. The use of the scale with American adolescent has revealed that it exhibits good internal consistency and high test-retest reliability (Ng et al., 2018). Research has also tended to support the psychometric properties of BMSLSS for use with clinical, medical and school samples (Athay, Kelley, & Dew-Reeves, 2012; Janssens et al., 2016). Confirmatory factor analyses with data from children and adolescents have supported a one-factor solution (Ye et al., 2013). Abubakar and team (2015) conducted multi-group confirmatory factor analysis of BMSLSS with data from adolescents and young adults across 23 countries (including China) and concluded that the scale possesses good psychometric properties. Similarly, a study by Zeng and colleagues (2018) provided further evidence for the cross-cultural equivalence of BMSLSS among Chinese and American middle school students. Although BMSLSS has been validated in a general Chinese context and found to have adequate cross-cultural and linguistic equivalence (Abubakar et al., 2015; Ye et al., 2013; Zeng et al., 2018), it has not been validated using a sample of gifted students.

The main aims of this study were to establish the validity of BMSLSS for use with Chinese gifted students,

and to assess its measurement equivalence across different levels of intelligence. In terms of measurement invariance, there are three levels of statistical equivalence to be considered: (i) *configural invariance*, referring to obtaining the same pattern of factor loadings of scale items across both groups; (ii) *metric invariance* is the equivalence of factor loadings linking items and constructs; and (iii) *scalar invariance* requires equivalence in both factor loading and intercepts across two groups. After ensuring measurement invariance of BMSLSS for gifted and average students, group level comparison of scores across groups may shed some light on whether intellectual ability is associated with stronger satisfaction with life in this Chinese sample. In reality, full scalar invariance is often difficult to obtain in practice, and it is sometimes necessary to release invariance constraints on some factor loadings or intercepts to achieve partial invariance (Merredith, 1993).

## **2. Methods**

### ***2.1 Participants and Procedures***

*2.1.1 Gifted Students:* Participants in this study were 676 Chinese gifted students from Hong Kong Academy of Gifted Education. The sample comprised 51.9% boys and 48.1% girls, with an average age of 13.50 years ( $SD = 2.1$ ). The Academy identifies gifted students in the age range 10 to 18, using evidence of the students' ability as reflected in their academic record at school, and additional evidence of creativity and task commitment. Talent performance in school and outside school is also taken into account. (Details of the selection processes used by the Academy can be found online at: [www.hkage.org.hk/en](http://www.hkage.org.hk/en).)

The second named author had requested approval to conduct data gathering activities at the Academy from the university's Human Research Ethics Committee (EA540112) and the Ethics Review Group of the Hong Kong Academy for Gifted Education. Emails inviting participation in the study were sent to all students at the Hong Kong Academy for Gifted Education and their parents. As a result, consent letters were obtained from the

students and their parents. It should be noted that 72.6% students completed the survey online while 27.4% completed the survey at the end of a summer program for gifted students. In both cases, completing the survey took approximately 15 minutes.

*2.1.2 Average students:* The average-ability students from regular schools were 702 Chinese students from 7 secondary schools in different regions of Hong Kong. The sample comprised 46.6% boys and 53.4% girls, with an average age of 13.61 (SD = 0.54). Approval to conduct data gathering activities was obtained from the university's Human Research Ethics Committee, and invitation letters were sent to Grade 7 to Grade 9 students and their parents. More than 95% students responded to our survey, those who refused were due to time conflict or low interest to participate. A teacher at the school provided key information on the scope, aim and contents of the proposed survey, and participants were encouraged to raise questions and seek clarification. Consent letters were then obtained from participating students and their parents. The students completed the survey in their classroom in about 20 minutes.

## ***2.2 Data Collection Instrument***

The *Brief Multidimensional Students' Life Satisfaction Scale* (BMSLSS) has 5 self-report items to evaluate students' life satisfaction in various domains. One additional item (item 6: 'overall satisfaction with my life') was used as a validity check (Seligson et al., 2003; Ye et al., 2013). A Chinese language version of BMSLSS, had already been produced and used by Ye et al. (2013), so this version was adopted without further changes. All respondents were asked to rate their satisfaction with family life, friendships, school experience, self, and environmental, using a Likert-type response style where 1=terrible; 2=unhappy; 3=mostly dissatisfied; 4=mixed feelings (about equally satisfied and dissatisfied); 5= mostly satisfied; 6=pleased; 7=delighted. The Cronbach's alphas for the 6-item scale were good for both samples: 0.887 for gifted students and 0.882 for regular students.

### *2.3 Data Analysis*

Descriptive and t-test statistics were performed using SPSS; and Mplus 8.0 was used for factor analysis and measurement invariance analyses. Several steps were required to validate BMSLSS with these Chinese gifted students, and then determine measurement invariance when applied with regular students. First, an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted with the data from the gifted students to examine factorial solution and factor loadings of BMSLSS. Data from half the gifted sample were used for EFA (N=322) and the other half used for CFA (N=354). After establishing measurement validity of BMSLSS with the gifted student sample, CFAs were again conducted in (non-split) gifted sample (N=676) and the regular sample (N=702). Multi-group CFA was then applied to test for configural invariance (same pattern of free loadings), metric invariance (common loadings), and scalar invariance (common loadings and intercepts) across the two groups. Results for partial strict invariance (common loadings, intercepts, and residual variances) was also recorded.

The fit indices used in this study to assess model fit were i) the comparative fit index (CFI) where values  $>0.90$  indicate acceptable fit and  $>0.95$  suggest good fit; ii) root-mean-square error of approximation (RMSEA) where values  $<0.08$  indicate acceptable fit, and  $<0.05$  suggest good fit. However, this value is sensitive to model complexity, a simple model with only few parameters may result a slightly larger RMSEA value; iii) standardized root-mean-square residual (SRMR) where values  $<0.05$  indicate good fit. Chi-square and degree of freedom were also recorded as a point of rough reference, because the values are sensitive to large sample size ( $N > 1300$  for our overall sample).

In addition to fit indices, modification indices (MI) that appeared to be large ( $>20$ ) were reported to identify source of any model misfit (Saris et al., 2009). Addressing model misfit is a complex issue and it is

always necessary to take into consideration theoretical, research and contextual knowledge in deciding whether to re-specify models. In terms of determining changes in model fit between two models, analysis involved applying Chen (2007)'s criterion of changes in CFA that are greater than 0.01 to indicate a significant change.

### **3. Results**

#### ***3.1 Descriptive Statistics***

The inter-correlations of the 5-item BMSLSS were moderately correlated with each other in gifted ( $r=0.48-0.63, p<0.001$ ) and regular ( $r=0.41-0.70, p<0.001$ ) student samples. The mean scores of BMSLSS items were higher for the gifted students than regular students, and subsequent t-test analysis indicated that the difference was statistically significant ( $p < .001$ ) (Table 1). The total of BMSLSS scores for all students (inclusive of gifted and regular) are 5.31 for item 1, 5.53 for item 2, 5.23 for item 3, 5.0 for item 4, 5.23 for item 5, and 5.46 for item 6.

<Insert Table 1 About Here>

#### ***3.2 Factor Analysis of BMSLSS with gifted students: EFA and CFA***

The EFA results based on the split sample ( $N=322$ ) supported a one-factor solution, accounting for 62.22% of total variance in the model. The factor loadings for family, friend, school, self, environment and overall were 0.83, 0.71, 0.81, 0.80, and 0.80 respectively. Further, the CFA results based on the other split sample ( $N=354$ ) had good fit with data ( $\chi^2(5)=38.26, CFI=0.952, SRMR=0.034, RMSEA=0.12, 90\%CI=0.09-0.14$ ). The standardized factor loadings for family, friend, school, self, environment and overall were 0.77, 0.62, 0.77, 0.76, and 0.68 respectively.

#### ***3.3 Multi-Group Confirmatory Factor Analyses***

After establishing one-factor solution for BMSLSS with Chinese gifted students through exploratory and

confirmatory factor analysis, multigroup confirmatory factor analyses were conducted with the gifted (non-split  $N=676$ ) and regular ( $N=702$ ) students respectively. The results suggested that each model (gifted student: CFI=0.95; SRMR=0.033; RMSEA=0.13, 90%CI=0.10-0.16,  $\chi^2(5)=66.57$ ; Regular students: CFI=0.90; SRMR=0.055; RMSEA=0.18 90%CI=0.15-0.19,  $\chi^2(5)=166$ ) had an adequate fit with the data.

The modification index nevertheless showed a high value in the correlations between item 2-friendship and 3-school experience in both models ( $MI>40$ ). Same issue was reported in Abubakar et al (2016)'s multilevel invariance testing of BMSLSS in 23 countries. Relaxing the correlated error term for item 2 and 3 improved the configural model (Abubakar et al., 2016). The overlapping in interpretation meanings across these two domains-friendship and school experience-has been noticed by previous research (Elmore & Huebner, 2010). Indeed, for children who spend the majority of their time in school, friendship is mostly related to the school environment. This may be more prevalent in Asian or Chinese contexts as schoolwork and time in classroom make up the majority of children's time use (Chen et al., 2018). Based on research and model re-specification criteria (Satorra, 1989; Whittaker, 2012), it was decided to relax correlated error term of items 2 and 3.

The inclusion of this parameter made a substantial improvement to the model fit (gifted student sample: CFI=0.97; SRMR=0.026; RMSEA=0.12, 90%CI=0.09-0.15,  $\chi^2(4)=46.18$ ; Regular student sample: CFI=0.98, SRMR=0.024, RMSEA=0.10 90%CI=0.07-0.14,  $\chi^2(4)=36.25$ ). The changes in CFI scores were from 0.954 to 0.97 for gifted students and from 0.90 to 0.98, indicating a significant improve greater than 0.01 (Chen, 2007). The Fig 1 presented the factor loadings from confirmatory factor analyses using gifted and mainstream student samples.

<Insert Fig 1. About Here>

### **3.4 Multi-group analysis: Chinese gifted ( $N=676$ ) and regular ( $N=702$ )**

The overall analyses suggested that BMSLSS showed adequate equivalence between gifted and regular students. The scale possessed full configural and metric invariance as well as partial scalar invariance. The Goodness-of-Fit Indexes in Table 2 suggested that both configural and metric invariance model showed a good fit with data. The full scalar model showed an adequate fit with the data. However, the changes in CFI suggested that the model fit was significantly worse than the metric invariance model as  $\Delta CFI$  (0.025) was greater than the cut-off of 0.01 (Chen, 2007). The Modification indices indicated large values for correlated error terms of item 3 and 4 in gifted student model (MI=40) and item 3 and 5 in mainstream student model (MI=29). After freeing these two parameters, the model fit greatly improved and partial scalar invariance was achieved across two groups.

<Insert Table 2 About Here>

### ***3.5 Latent Mean Invariance***

We tested whether factor mean (the latent variable made up of BMSLSS items) was invariant across two groups after ensuring partial scalar invariance. The results suggested that students in mainstream schools reported a significantly lower factor mean of BMSLSS than students in the gifted program (Estimates=-0.47,  $p<0.01$ ). This result was consistent with the observed mean-level differences in BMSLSS scores across two groups, with students in mainstream schools reporting statistically lower life satisfaction ( $t=-7.47$ ,  $p<0.01$ ).

## **4. Discussion**

This study achieved its aim by determining the psychometric soundness of BMSLSS when used with a sample of Chinese gifted students. The study also established that the scale is equally applicable for research with mainstream students of average ability. Findings from the study revealed that BMSLSS had adequate internal consistency, and yielded a one-factor solution for a Chinese gifted student sample. Results from EFA and CFA

supported the underlying theoretical framework of life satisfaction as a global and multidimensional construct (Seligson et al., 2003; Ye et al., 2013). Although BMSLSS had been used widely in school and nonclinical samples, its applicability and usefulness with children from different cultural and ability groups has been less researched.

The measurement invariance tests, which included configural, metric, and scalar, provided further evidence that Chinese gifted students conceptualize and evaluate life satisfaction in the same way as their less academically capable peers. The results from multi-group analyses indicated full configural, full metric and partial scalar invariance. Gifted students responded to BMSLSS items and latent construct in the same way as their peers. After achieving partial scalar, latent mean comparison further suggested that gifted students rated their life more satisfactorily and positively than their peers in non-gifted program.

Results from t-test and latent mean comparisons both suggested that Chinese gifted students reported higher levels of BMSLSS as an overall evaluation as well as in various domains. More analysis and research are needed to ascertain if these differences could be partly attributable to intellectual traits. Ensuring measurement equivalence builds foundations for future studies that explore the nature, degree, and impact of these seemingly large differences.

The findings should be interpreted in light of limitations. This study was not able to obtain data on test-retest reliability. Given our dataset is cross-sectional, test-retest reliability and measurement invariance across time would require future studies. Chinese BMSLSS has been found reliable over a two-week interval (Ye et al., 2013), but research with longer time span is needed.

The findings bear significant practical and clinical implications in school settings. Teachers, school counsellors, and psychologists could utilize BMSLSS to monitor the overall level of life satisfaction in students,



(particularly those who are presenting with emotional problems). Given that adolescent gifted students are often under greater social and academic pressure, using BMSLSS to evaluate their current wellbeing status would be a valuable step for a counsellor investigating the student's problems. The scale could also be used when evaluating any school program designed to increase the subjective wellbeing and happiness of gifted and regular students.

## 5. Conclusion

This study examined the equivalence of BMSLSS in a large sample of gifted and regular students in Hong Kong. The findings support the applicability and measurement equivalence of BMSLSS for use with Chinese gifted and average-ability students.

## References

- Abubakar, A., van de Vijver, F., Alonso-Arbiol, I., He, J., Adams, B., Aldhafri, S., ... & Dimitrova, R. (2016). Measurement invariance of the brief multidimensional student's life satisfaction scale among adolescents and emerging adults across 23 cultural contexts. *Journal of psychoeducational assessment, 34*(1), 28-38.
- Athay, M. M., Kelley, S. D., & Dew-Reeves, S. E. (2012). Brief Multidimensional Students' Life Satisfaction Scale—PTPB Version (BMSLSS-PTPB): Psychometric properties and relationship with mental health symptom severity over time. *Administration and Policy in Mental Health and Mental Health Services Research, 39*(1-2), 30-40.
- Bergold, S., Wirthwein, L., Rost, D. H., & Steinmayr, R. (2015). Are gifted adolescents more satisfied with their lives than their non-gifted peers?. *Frontiers in psychology, 6*, 1623.
- Chmiel, M., Brunner, M., Keller, U., Schalke, D., Wrulich, M., & Martin, R. (2012). Does childhood general

- cognitive ability at age 12 predict subjective well-being at age 52? *Journal of Research in Personality*, 46(5), 627-631.
- Chan, D. W. (2007). Positive and negative perfectionism among Chinese gifted students in Hong Kong: Their relationships to general self-efficacy and subjective well-being. *Journal for the Education of the Gifted*, 31(1), 77-102.
- Chan, D. W. (2012). Life satisfaction, happiness, and the growth mindset of healthy and unhealthy perfectionists among Hong Kong Chinese gifted students. *Roeper Review*, 34(4), 224-233.
- Chen, X., Cheung, H. Y., Fan, X., & Wu, J. (2018). Factors related to resilience of academically gifted students in the Chinese cultural and educational environment. *Psychology in the Schools*, 55(2), 107-119.
- Diener, E. (1994). Assessing subjective well-being: Progress and opportunities. *Social indicators research*, 31(2), 103-157.
- Diener, E., & Fujita, F. (1995). Resources, personal strivings, and subjective well-being: a nomothetic and idiographic approach. *Journal of personality and social psychology*, 68(5), 926.
- Francis, R., Hawes, D. J., & Abbott, M. (2016). Intellectual giftedness and psychopathology in children and adolescents: A systematic literature review. *Exceptional Children*, 82(3), 279-302.
- Gilman, R., & Huebner, S. (2003). A review of life satisfaction research with children and adolescents. *School Psychology Quarterly*, 18(2), 192.
- Huang, S. P., Kong, Y., & Cheng, Y. (2018). Public images of gifted programs in China: A 38-year analysis of Chinese news reports on gifted education. *Gifted and Talented International*, 33(1-2), 41-51.
- Huebner, E. S., & Alderman, G. L. (1993). Convergent and discriminant validation of a children's life

- satisfaction scale: Its relationship to self-and teacher-reported psychological problems and school functioning. *Social indicators research*, 30(1), 71-82.
- Janssens, A., Rogers, M., Gumm, R., Jenkinson, C., Tennant, A., Logan, S., & Morris, C. (2016). Measurement properties of multidimensional patient- reported outcome measures in neurodisability: a systematic review of evaluation studies. *Developmental Medicine & Child Neurology*, 58(5), 437-451.
- Jiang, X., Fang, L., & Lyons, M. D. (2019). Is Life Satisfaction an Antecedent to Coping Behaviors for Adolescents?. *Journal of youth and adolescence*, 48(11), 2292-2306.
- Jiang, X., Lyons, M. D., & Huebner, E. S. (2016). An examination of the reciprocal relations between life satisfaction and social problem solving in early adolescents. *Journal of adolescence*, 53, 141-151.
- Jin, S. U., & Moon, S. M. (2006). A study of well-being and school satisfaction among academically talented students attending a science high school in Korea. *Gifted Child Quarterly*, 50(2), 169-184.
- Lippman, L.H., Moore, K.A. and McIntosh, H. (2011) Positive Indicators of Child Well-Being: A Conceptual Framework, Measures, and Methodological Issues. *Applied Research in Quality of Life*, 6, 425-449.
- Lu, J., Li, D., Stevens, C., & Ye, R. (2017). Comparisons and analyses of gifted students' characteristics and learning methods. *Gifted Education International*, 33(1), 45-61.
- Lubinski, D., & Benbow, C. P. (2006). Study of mathematically precocious youth after 35 years: Uncovering antecedents for the development of math-science expertise. *Perspectives on psychological science*, 1(4), 316-345.
- Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, 58(4), 525-543.
- Ng, Z. J., Huebner, E. S., Maydeu-Olivares, A., & Hills, K. J. (2018). Confirmatory factor analytic structure and

- measurement invariance of the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS) in a longitudinal sample of adolescents. *Child Indicators Research*, 11(4), 1237-1247.
- OECD (Organization for Economic Cooperation and Development). (2020). *Better life index*.
- Retrieved from: <http://www.oecdbetterlifeindex.org/topics/life-satisfaction/>
- Proctor, C. L., Linley, P. A., & Maltby, J. (2009). Youth life satisfaction: A review of the literature. *Journal of happiness studies*, 10(5), 583-630.
- Roberts, S. M., & Lovett, S. B. (1994). Examining the "F" in gifted: Academically gifted adolescents' physiological and affective responses to scholastic failure. *Journal for the Education of the Gifted*, 17(3), 241-259.
- Satorra, A. (1989). Alternative test criteria in covariance structure analysis: A unified approach. *Psychometrika*, 54(1), 131-151.
- Seligson, J. L., Huebner, E. S., & Valois, R. F. (2005). An investigation of a brief life satisfaction scale with elementary school children. *Social Indicators Research*, 73(3), 355-374
- Sun, R. C., & Shek, D. T. (2010). Life satisfaction, positive youth development, and problem behaviour among Chinese adolescents in Hong Kong. *Social indicators research*, 95(3), 455-474.
- Whittaker, T. A. (2012). Using the modification index and standardized expected parameter change for model modification. *The Journal of Experimental Education*, 80(1), 26-44.
- Vialle, W. (2007). Pink or Paris?: Giftedness in popular culture. *Australasian Journal of Gifted Education*, 16(1), 5.
- Ye, M., Li, L., Li, Y., Shen, R., Wen, S., & Zhang, J. (2014). Life satisfaction of adolescents in Hunan, China:

Reliability and validity of Chinese brief multidimensional students' life satisfaction scale (BMSLSS). *Social Indicators Research*, 118(2), 515-522.

Zeng, Y., Ling, Y., Huebner, E. S., He, Y., & Fu, P. (2018). Assessing the measurement invariance of the brief multidimensional students' life satisfaction scale in Chinese and American adolescents. *Quality of Life Research*, 27(1), 259-266.

## Table Captions

Table 1. Item correlations, means, standard deviations and cronbach's alphas of BMSLSS in gifted and regular students.

Item	Gifted Students						Average Students						<i>t-test</i>
	1	2	3	4	5	6	1	2	3	4	5	6	
1. Family	-						-						7.79***
2. Friend	0.48***	-					0.48***	-					4.40***
3. School	0.55***	0.54***	-				0.56***	0.70***	-				6.60***
4. Self	0.58***	0.42***	0.63***	-			0.48***	0.46***	0.51***	-			5.81***
5. Environment	0.62***	0.40***	0.48***	0.51***	-		0.59***	0.49***	0.41***	0.53***	-		4.26***
6. Overall	0.77***	0.54***	0.67***	0.72***	0.68***	-	0.69***	0.64***	0.63***	0.67***	0.70***	-	7.47***
Mean	5.59	5.66	5.45	5.22	5.67	5.69	5.03	5.39	5.01	4.79	5.38	5.23	-
(SD)	(1.26)	(1.08)	(1.21)	(1.35)	(1.27)	(1.08)	(1.39)	(1.17)	(1.27)	(1.38)	(1.25)	(1.23)	-
Range	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	-
N	676	676	676	676	676	676	702	702	702	702	702	702	-
Cronbach's alpha			0.887						0.882				-

\*\*\* $P < 0.001$

Table 2 Invariance Models and Goodness-of-Fit Indexes of the Multi-group Analysis for Chinese gifted (N=676) and regular students (N=702).

Model	$\chi^2$ (df)	RMSEA (90%CI)	SRMR	CFI	$\Delta$ CFI
Configural <sup>a</sup>	82.44(8)	0.11 (0.09, 0.14)	0.02	0.97	
Metric	96.57(12)	0.10(0.08, 0.12)	0.05	0.97	ns
Scalar	168.65(17)	0.11(0.09, 0.13)	0.10	0.94	0.03
Partial Scalar <sup>b</sup>	91.66(15)	0.08(0.07, 0.10)	0.10	0.97	ns
Partial Strict <sup>b</sup>	130.23(20)	0.09 (0.08, 0.10)	0.13	0.96	0.01

Notes. Ns=non-significant

RMSEA Root-mean-square error of approximation, SRMR Standardized root-mean-square residual, CFI Comparative fit index,  $\chi^2$  Chi-square test, df degree of freedom,  $\Delta$  change in the model

<sup>a</sup> with residual covariance (Item 2 & 3) in both samples <sup>b</sup> with residual covariance (Item 3&4 for gifted student sample; Item 3 & 5 for mainstream student sample).

Figure

Figure 1. Model illustration for confirmatory factor analysis for the BMSLSS using Chinese gifted student sample (N = 676) and regular student sample (N = 702). Standardized item coefficients are shown for Gifted /Regular student sample at p-value less than 0.01.

